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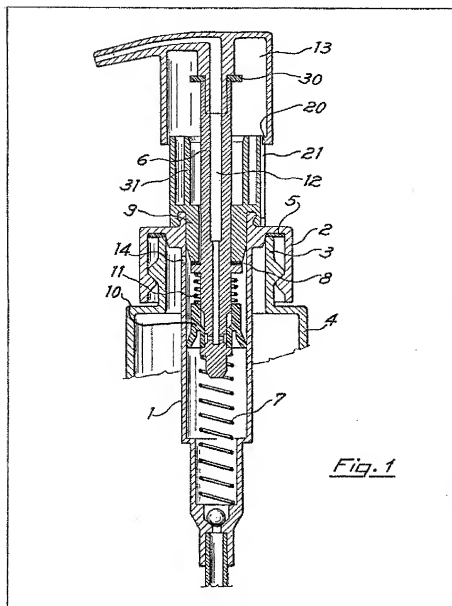
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(54) **Handpump for dispensing fluids**

(57) A handpump is equipped with locking means (20, 21) for locking a cap (13) on an operating rod (6) in a substantially fully inward position and sealing means (30, 31) between the rod (6) and the cap (13) on the one hand and a hollow body (1, 9) through

which the rod (6) passes on the other hand to prevent the outflow of fluid from the pump through passage means (14) provided to intercommunicate the interior of the pump to atmosphere when the rod (6) is pushed inward against spring pressure on the operating stroke of the pump.



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Fig. 1

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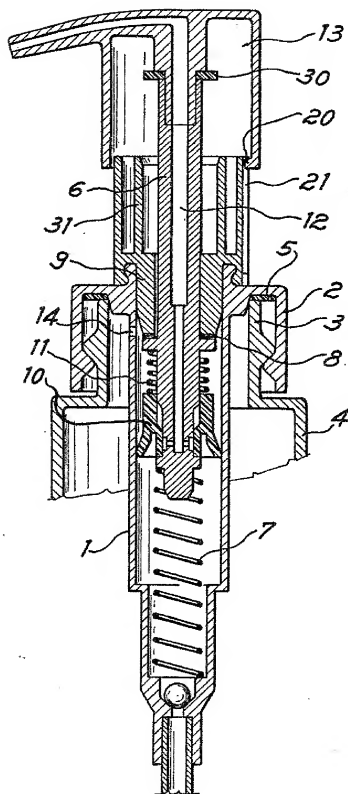


Fig. 2

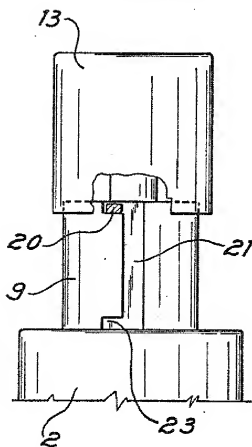
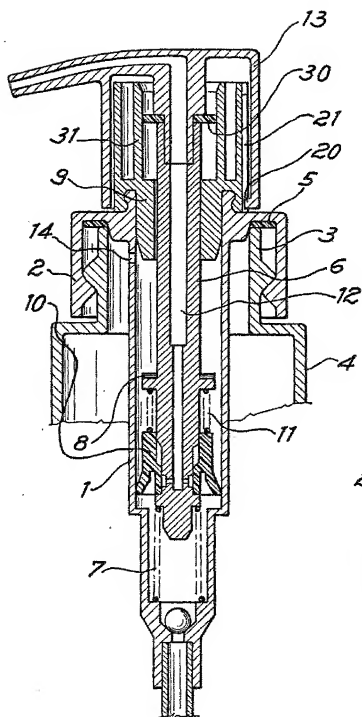
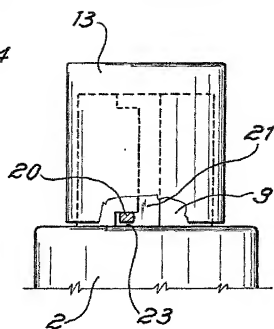


Fig. 3Fig. 4

## SPECIFICATION

## Handpump for dispensing fluids

The invention relates to handpumps for dispensing fluids contained in receptacles to which the handpumps are fitted.

Fluids in the form of liquids or creams can be expelled under pressure by handpumps, in an atomized or nebulized form (in the case of liquids) or simply under pressure (in the case of creams). Such pumps are described in French Patent Specification 2,097,353; U.S. Patent Specification 3,500,761; 3,774,849 and 4,228,931. Such pumps may be transported only in certain conditions if fitted to a filled receptacle to prevent leakage and may have to be stored in such a condition even though they then occupy considerable volume.

The invention provides a handpump for dispensing fluid having a hollow body for fitting on a receptacle, an operating rod extending at one end in the hollow body and carrying a piston, the other end of which projects from the hollow body and carries a distributor cap, means for isolating the interior of the receptacle from atmosphere when the rod is pushed outward by spring bias to a rest position and for causing the fluid to be dispensed when the rod and the cap are pushed against spring bias from the rest position and passage means for interconnecting the interior to atmosphere when the rod and distributor cap are so displaced inwards in which locking means are provided for locking the cap in a substantially fully inward position and sealing means between the rod and the cap on the one hand and the hollow body on the other hand for sealing off said passage means when the cap and the rod are in the aforementioned substantially fully inward position. Preferably a sealing ring is connected to the rod and is seated against an internal cylindrical wall of the hollow body extending alongside the rod.

Suitably the hollow body has a pump body and a retaining body secured to the outside of the pump body forming the internal cylindrical wall around the part of the operating body projecting outwards from the pump body. Advantageously the locking means include a recess and a projection for engaging in the recess formed on relatively moving parts of the pump. Preferably the cap has a skirted portion surrounding a cylindrical part of the hollow body itself surrounding the rod and the recess and projection are formed in facing parts of the skirted portion and the cylindrical part. The sealing means can then be located inside the cylindrical part. The valve can be locked with the cap and rod retracted so reducing the volume occupied in storage; at the same time leakage of fluid is resisted.

## Drawings:

Figures 1 and 3 show a longitudinal section of the pump fitted to the mouth of a receptacle respectively in a rest condition with the distributor hood in a position furthest away from the hollow

body of the pump and in a locked position with the distributor hood closest to the hollow body; and

Figures 2 and 4 show a side view partly cut away of the pump in the two different positions corresponding respectively to those of Figure 1 and Figure 3.

The main body of the pump is shown schematically. The main body includes a hollow body 1 the upper end of which is solid with a collar 2 which can be snap-fitted to the mouth 3 of a receptacle 4 which contains a liquid or creamy substance to be distributed. Alternatively, the collar 2 may be secured to the mouth 3 by screwing or by a bayonet-fitting. A seal 5 is fitted between the collar 2 and the free end of the mouth 3. A lower end of a hollow and movable rod 6 extends through the interior of the hollow body 1. The rod 6 is pushed outwardly by a spring 7 which acts on its lower extremity.

The rod 6 is kept in the normal rest position shown in Figure 1 by the spring 7 and engages in this position a seal 8 which is itself fitted against a retaining body 9 solid with the hollow body 1. A movable sleeve 10 is mounted on the lower part of the rod 6. A spring 11 acts on the sleeve 10. The sleeve 10 can be moved between two positions in one of which shown in Figures 1 and 3 the sleeve closes the openings which communicate with a longitudinal internal passage 12 of the rod 6 and in the other of which the sleeve leaves said openings free.

A distributor hood 13 is mounted on the free end of the rod 6. A channel passes through the hood 13 for distributing material contained in the receptacle 4 to the outside. At least one opening 14 is provided in the hollow body 1 whilst a visible passage is provided between the retaining body 9 and the rod 6 shown to the left of the rod in Figures 1 and 3 either by providing play between the components or by providing a cutaway. When the rod is lowered moving from the position shown in Figure 1 and consequently the seal 8 moves away from the adjacent end of the retaining body 9, air from atmosphere can reach the interior of the receptacle through the aforementioned visible passage and the opening 14. In this way the formation of low pressure in the interior of the receptacle 4 can be avoided and the material enclosed in the receptacle can consequently flow freely towards the exterior.

The construction of the pump described thus far has been made solely to give an example of the design of the pump itself. Pumps of this type are for example described in detail in the U.S. Patent Specification No. 3,500,761; 3,774,849; and 4,228,931. The distinguishing feature of the pumps of the invention is that there are means for locking the distributor head in the lowered position. In this particular case there is provided a tooth 20 projecting towards the interior of the hood 13 and movable in a slot 21 which is recessed and extends longitudinally of the external surface of the retaining body 9. At the upper and lower ends of the slot 21 it is profiled to form two re-entrant portions 23 which can receive the tooth

20 as the hood 13 is rotated simply on the body of the pump. In Figure 2 the tooth 20 of the hood 13 is shown lodged in the upper re-entrant portion 23. In such a condition the hood 13 cannot be lowered and any involuntary distribution of the material contained in the receptacle is consequently prevented.

- Having turned the hood so as to align the tooth 20 with the axis of the slot 21, the hood 13 can be lowered towards the collar 2 and at the end of such movement the hood 13 can once more be turned to bring the tooth 20 into the re-entrant portion 23 provided at the lower end of the slot 21. In this position the hood 13 is locked in position close to the collar 2 (Figure 3 and 4). In such a condition the pump together with its hood 13 occupies a much smaller volume than that which it would occupy in the normal rest condition shown in Figures 1 and 2. This is important because the pump can then be stored and transported occupying a much reduced volume. In the rest condition shown in Figure 1 the liquid or creamy substance contained in the receptacle cannot flow outwards through the passage provided between the rod 6 and the retaining body 9, even if the receptacle to which the pump is fitted is turned upside down, because this is prevented by the seal 9 provided between the rod and the retaining body 9 as can be seen clearly in Figure 1.

- In order to prevent equally the flowing out of liquid or material when the hood is in the locked-down position (Figures 3 and 4) an annular fitting 30 (Figures 1 and 3) is mounted between the rod and the hood whilst a continuous tubular wall 31 is arranged to project from the retaining body 12, said wall 31 forming a cylindrical surface which engages the fitting 30 in sealing contact (Figure 3) when the hood is locked in the rest position. In these conditions the liquid which eventually flows out through the orifice 14 and the passage between the rod and the body 9 will be blocked by the interaction between the fitting 30 and the tubular wall 31. Clearly in place of having the construction described, the fitting could be solid with the fixed body of the pump and act on the shaped position and with an enlarged section of the rod or the hood. Alternatively the fitting supported by the rod or the hood could engage a conical surface solid with the fixed part of the pump in which case the hood would be locked in the lowered position of Figures 3 and 4. It is equally clear that the teeth 20, instead of projecting towards the interior of the hood, could project outwards and engage in a channel and hollow grooves in the internal surface of the an external tubular wall fixed to the hood. Also such teeth could project directly from the rod 6 and be movable in one or more channels and respectively hollow grooves in the internal surface of the cylindrical part of the body 9 adjacent the rod.

- In any case the considerable simplification of the construction of the pump is evident. The pump can be transported in a lying or inverted position and the liquid contained in the receptacle cannot

escape even if the pump is locked in the position of Figures 3 and 4.

#### CLAIMS

1. A handpump for dispensing fluid having a hollow body for fitting on a receptacle, an operating rod extending at one end in the hollow body and carrying a piston, the other end of which projects from the hollow body and carries a distributor cap, means for isolating the interior of the receptacle from atmosphere when the rod is pushed outward by spring bias to a rest position and for causing the fluid to be dispensed when the rod and the cap are pushed against spring bias from the rest position and passage means for interconnecting the interior to atmosphere when the rod and distributor cap are so displaced inwards in which locking means are provided for locking the cap in a substantially fully inward position and sealing means between the rod and the cap on the one hand and the hollow body on the other hand for sealing off said passage means when the cap and the rod are in the aforementioned substantially fully inward position.
2. A hand pump according to claim 1 in which a sealing ring is connected to the rod and is seated against an internal cylindrical wall of the hollow body extending alongside the rod.
3. A hand pump according to claim 2 in which the hollow body has a pump body and a retaining body secured to the outside of the pump body forming the internal cylindrical wall around the part of the operating body projecting outwards from the pump body.
4. A hand pump according to any of the preceding claims in which the locking means include a recess and a projection for engaging in the recess formed on relatively moving parts of the pump.
5. A hand pump according to claim 4 in which the cap has a skirted portion surrounding a cylindrical part of the hollow body itself surrounding the rod and the recess and projection are formed in facing parts of the skirted portion and the cylindrical part.
6. A hand pump according to any of the preceding claims in which the locking means are adapted for locking the cap in a substantially fully outward position.
7. A hand pump substantially as described with reference to and as shown in the drawings.
8. A handpump for dispensing fluid having a hollow body for fitting on a receptacle, an operating rod extending at one end in the hollow body and carrying a piston, the other end of which projects from the hollow body and carries a distributor cap, means for isolating the interior of the receptacle from atmosphere when the rod is pushed outward by spring bias to a rest position and for causing the fluid to be dispensed when the rod and the cap are pushed against spring bias from the rest position and passage means for interconnecting the interior atmosphere when the rod and distributor cap are so displaced inwards in which locking means are provided for locking the

cap in a substantially fully inward position and  
sealing means connected to the rod or the hollow  
body and a corresponding seat formed by the

hollow body or cap respectively for closing said  
5 passage means when the cap and the rod are in  
the fully outward position.